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The Honey Bee.

(FOURTH AND FINAL NODICUM.)

That the mother of so large a family, and queen of so rich a store, passes her honeymoon somewhere may be reasonably supposed; but such is her innate modesty, that the time and scene of her matrimonial trip was long involved in the utmost mystery. It was uncertain whether she loves the pale moonlight, or whether, as Huber was inclined to suppose, she prefers a bright May morning; though it is now known that she selects the hour of "high noon," and, Hero-like, lights her torch of love on high, though she scrupulously shuns the curious eye of man, and for ages baffled his endeavors to pry into those mysteries which she so sedulously conceals.

If it should be thought surprising that men who devoted their life-time to studying the habits of bees, failed to come to any satisfactory conclusion on this subject, till recently involved in mystery, it will be far more a matter of wonder, to learn what they have been unable to discover. We allude particularly to the power possessed by the workers, when they have lost their natural monarch, of converting the grub of one of the common bees into a royal and consequently prolific personage. Such an extraordinary assertion, first published by Schirach, though probably known in earlier times, may be supposed to have met with no ordinary opposition, but it has been confirmed by repeated observations and experiments, and is as well attested—thanks to Huber especially—as any such facts can ever be. Being so established we may assert it to be (without any reservation whatever,) by far the most extraordinary fact ever brought to light in natural history.

Fully to comprehend it, we must refer our readers to the great differences we stated in a former part of these papers to exist between the workers and the queen, or rather to the more minute anatomical distinctions given by entomological writers, and then they are called upon to believe that, by enlarging three common cells into one, and feeding the worm not more than three or four days old, with a peculiar food, richer than the common bread—called, from its queen-making qualities, "royal jelly,"—not only is its body lengthened, its wings shortened—its wax-pockets, and its bread-baskets, and the down on its legs obliterated—its sting and proboscis altered in shape—its fertility developed—but all its instincts and habits so completely changed, that no difference whatever is observable, when it emerges from the cell, between it and the rightful queen, either in the character and duties it assumes or in the reverence paid to it by the masses.

We wish much that we had space to describe at length the jealousy and combats of rival queens, the senses of bees, and their architecture, as well as the general economy of the hive. But half the interest of these things depends on that freshness and minuteness of detail which is best given in the words of the original eye-witnesses. It is only by a figure that we can include, in this class, him who has been deservedly placed at the head of all writers upon bees—the intelligent and enthusiastic FRANCIS HUBER. No one who ever hopes to be master of a bee-house, should be ignorant of his services, or of the difficulties under which he performed them. His name has been so long before the public, that many will learn with surprise that he died, at the age of eighty-one, so late as December, 1831. An appropriate tribute has been paid to his memory by his brother naturalist—De Candolle.

Francis Huber was a precocious and enthusiastic child, and the pride of his father, who imparted to him that love of science, which, while it produced the misfortune, proved also the comfort of his life. One of his relations had ruined himself in his search after the philosopher's stone; and he himself impaired God's greatest blessing of sight at the early age of fifteen, by the ardor with which he devoted himself to philosophical studies. His father sent him to Paris to be under the care of the most experienced physicians; but, though his general health, which had also given way, was restored by the sensible prescription of rural life and diet, the cataract baffled the skill of the oculist Venzel, and he was sent home with no better promise than that of confirmed and increasing blindness. "His eyes, however," says his biographer De Candolle, "notwithstanding their weakness, had, before his departure and after his return, met those of Maria Aimee Lullin, a daughter of one of the Syndics of the Swiss Republic. They had been companions at the lessons of the dancing-master, and such a mutual love was cherished as the age of seventeen is apt to produce." It was far too deep and too true an affection to run smooth. The father of the girl naturally regarded the growing blindness of the youth as destructive of all advancement in life, and positively forbade his suit. Meanwhile poor Huber dissembled his increasing infirmity as well as he could, and, with a pardonable fraud, spoke as though he could really see. There was at least language enough in his eyes for Maria Lullin, and she, resolute as her father, would allow no subsequent misfortune to quench the light of other and happier days. At twenty-five and not till then, did the law allow her to decide for herself, and seven long years was a dangerous trial for any girl's fortitude, beset with the remonstrances of her friends, and the daily vanishing hopes of restoration of sight to her lover. But she was nobly faithful. She was proof against all persecutions and persuasions; and when seven weary years were gone, she gave her hand where her heart had been given long before—to him, who, though her husband, could scarcely act the part of her protector. The youthful partners at the dancing-academy, naturally ripened into partners for life, and she became not only Huber's wife, but his assistant in his researches—she was "eyes to the blind," his reader, his secretary, his observer.

No higher praise can be given to Huber than to say he was worthy of her. He was the most affectionate and devoted of husbands.

"Her voice was all the blind man knew,
But that was all in all to him."

"As long as she lived," he used to say in his old age, "I was not sensible of the misfortune of being blind." And alluding to her small stature, he would apply to her the character of his favorite bees,

"Ingentes animos angusto in pectore vertant."

Huber was not only fortunate in his wife, but also in his servants and children. Burnens, who, under his direction and tuition, made the greater part of his observations on bees for him, has this tribute paid to him by his master and friend.

"It is impossible to form a just idea of the patience and skill with which Bernens carried out the experiments which I am about to describe. He often watched some of the working-bees of our hives, which we had reason to think fertile, for the space of four-and-twenty hours, without taking rest or food, in order to surprise them at the moment when they laid their eggs. I frequently reproached myself for putting his courage and patience to such a trial; but he interested himself quite as much as I did in the success of our experiments, and counted fatigue and pain as nothing in comparison with the great desire he felt to know the results. If then there be any merit in the discoveries, I must share the honor with him; and I have great satisfaction in rendering him this act of public justice."

As to Huber himself, we took up his book with the not unreasonable prejudice of not liking to be led by a "blind guide," and with the common notion that all his discoveries had been proved the mere work of an imagination naturally rendered more lively by being severed from the view of external objects. We confess ourselves to have been entirely misled. Like every enthusiast who ventures to brave the prejudices of self-satisfied mediocrity, by the bold statement of his discoveries, he met with a torrent of ridicule and abuse, which he hardly lived to see stemmed. Though fancy must ever throw some little of her coloring over a subject such as this, (for all imputations of human motives to such creatures must be merely fanciful,) yet Huber's facts are now admitted unchallenged. To him we are indebted for the knowledge that wax is produced from honey, of the impregnation of the queen-bee, of the existence of fertile workers, of artificial queens, of the use of the antennæ, of the senses and respiration of bees, and of endless discoveries in their general economy and management. Many, indeed most of these things, had been suggested before, but Huber by his earnest zeal and captivating style, achieved for bees what Scott has

done for his native lochs and mountains—he wrote them into notice and interest;—and he confirmed or refuted by actual experiment, the floating notions of his predecessors, so that, though not positively the first originator of the doctrines that are generally referred to him, and though succeeding ages will doubtless question and improve upon his theories, Huber's name will ever remain in bee-knowledge, what that of Bacon is in inductive philosophy, and Newton in science, and Watt in steam.

"The bee," says an old writer, "is but a year's bird with some advantage." Those 'hatched,' as Evelyn would say, in May, die before the following year. Dr. Bevan, indeed, gives only an average of six months to the worker, and four to the drone. We think he cuts the life of the worker too short, as no doubt some live till July of the following year. If his account were correct, the sacrifice of their lives by stifling would not be so great a loss as it would at first appear. But their use in the second year, is not so much for gathering honey, as for tending and nursing the young.* The queen-bee, though she does not "live forever," has certainly been known to last to a fourth and even a fifth summer. The duration of a bee-colony, is of course a very different thing to the life of an individual bee, though they seem, by the ancients especially, often to have been confounded. Columella assigns ten years as the utmost limit to a hive, and though instances are brought forward of a longer period, naturalists seem to be agreed that this would be the ordinary termination of a hive left to itself.

Whatever may be the period which nature or man allots to the life of the queen or the worker, there is one sad inhabitant of the hive who is seldom allowed, even by his own species, to bring his dreary autumn to a natural close. About the middle of August, the "awful massacre of the innocents," the killing of the drones, begins. "After which time," as Butler has it, "these amazonian dames begin to wax weary of their mates, and to like their room better than their company. When there is no use of them, there will be no room for them. For albeit, generally among all creatures, the males as the most worthy do master the females, yet in these the females have the pre-eminence, and by the grammarian's leave, the feminine gender is more worthy than the masculine." There is something unavoidably ludicrous in the distresses of these poor Jerry Sneaks.

* This is a mistake and the reverse of the truth. Old bees do not tend and nurse the brood. This is done almost exclusively by the young. Even in the spring the younger bees superintend the nursing of the early brood.—Ed.

Having lived in a land of milk and honey all summer long, partaken of the best of everything, without even stirring a foot towards it, coddled and coaxed, and so completely "spoilt" that they are fit for nothing, who can see them "taken by the hind legs and thrown down stairs," with a heap of workers on top of them—their vain struggles to return—their adroit attempts to steal in slyly—their disconsolate resignation at last—without thinking it a just retribution for the past months of a pampered and unprofitable life? And yet there is mingled with this feeling a degree of pity for these "melancholy Jacqueses" thrown aside (we mix our characters as in a masquerade) by the imperious and unrelenting Catharine of the hive. "At first, not quite forgetting their old familiarity, they gently give them Tom Drum's entertainment: they that will not take that for a warning, but presume to force in again among them, are more shrewdly handled. You may sometimes see a handful or two before a hive which had been killed within; but the greatest part fly away and die abroad." We need not name the author we are quoting, who, fearful that womankind would take this Danaid character for their example, proceeds: "But let not nimble-tongued sophisters gather a false conclusion from these true premises, that they, by the example of these, may arrogate to themselves the like superiority: for *ex particulari non est syllogizare*; and He that made these to command their males, commanded them to be commanded. But if they would fain have it so, let them first imitate their singular virtues, their continual industry in gathering, their diligent watchfulness in keeping, their temperance, chastity, cleanliness, and discreet economy, &c.," and so he sums up all womanly virtues from this little type, as if he believed in the transmigration of souls described by Simonides—not him of Cos—in his Iambics. We give the translation as we find it No. 209 of the "Spectator."

"The tenth and last species of woman were made out of a bee; and happy is the man who gets such an one for his wife. She is altogether faultless and unblameable. Her family flourishes and improves by her good management. She loves her husband and is beloved by him. She brings him a race of beautiful and virtuous children. She distinguishes herself among her sex. She is surrounded with graces. She never sits among the loose tribe of women, or passes away her time with them in wanton discourses. She is full of virtue and prudence, and is the best wife that Jupiter can bestow on man." What can be the better than wish that every good bee-master may meet with a bee-wife.

We very much question the utility of the common "moralities" drawn from the industry and prudence of the bee. Storing and hoarding are rather the curse than the requirement of our ordinary nature, and few, except the very young and very poor, require to have this sermon impressed upon them. We are rather inclined to believe that, had Almighty Wisdom intended *this* to be the lesson drawn from the consideration of the works of his creatures, we should have been referred, in his revealed word, to the housewifery of this insect "fowl of the air," rather than to the ravens, "which have neither store-house nor barn." Yet the thrifty bee is never once set before us as a pattern in the Bible. The wise King indeed, "who spake of beasts, and of fowls, and of creeping things, and of fishes," has referred the sluggard and the distrustful to the early hours and the "working while it is yet day," and the guileless security of the ant; but we see nothing in his words which necessarily implies approbation of that anxious carefulness for the morrow, which we are elsewhere expressly told to shun, and which is but too often the mask of real covetousness of heart. And we believe this the more because the ant, though it wisely provides for its daily bread, *does not* lay up the winter store wherewith to fare sumptuously every day.

We know that in saying this, we are flying into the uplifted eyes of careful mothers, and bachelor uncles, who time out of mind have quoted, as it had been quoted to them, the busy bee as the sure exemplar of worldly prudence and prosperity. But we think that we can show them a more excellent way even for earthly honor, if they, as Christ's servants, will content themselves with those types in the natural world, which He himself has given them, and learn that quiet serenity and trustful contentedness, and ready obedience, and active labor for the present hour, which He has severally pointed out to us in the lilies, the ravens, the sheep, and the emmets, rather than seek elsewhere for an emblem of that over-curious forecasting for the future, which, whether in things spiritual or temporal, is plainly discouraged in the Word of God—those laws and judgments of the Lord, which are *sweeter than the honey and the honey-comb*, and in the keeping of which "there is great reward."

"Take that, and He that doth the ravens feed,
Yes, providently caters for the sparrow,
Be comfort to thy age."

Not but that the bee affords us a moral, though it be not that which worldly wisdom commonly assigns to it. We have in the first place, a direct

cause for thankfulness in the delicate food with which it supplies us. "The bee is little among such as fly, but her fruit is the chief of sweet things," (Eccles., xi, 3,) and the Almighty has in many senses, and in no common cases, supplied the houseless and the wanderer with "wild honey," and "a piece of honey comb," and "honey out of the stony rock;" and "a land flowing with milk and honey," has been, from the first the type of another and a better country. And the little honey-maker is itself indeed one of the most wonderful proofs of the goodness and power of God. That within so small a body should be contained apparatus for converting the "virtuous sweets" which it collects, into one kind of nourishment for itself—another for the common brood, a third for the royal—glue for its carpentry—wax for its cells—poison for its enemies—honey for its master—with a proboscis almost as long as the body itself, microscopic in its several parts, telescopic in its mode of action—with a sting so infinitely sharp, that were it magnified by the same glass which makes a needle's point seem a quarter of an inch, it would yet itself be invisible; and this too a hollow tube;—that all these varied operations and contrivances should be closed within half an inch of length and two grains of matter, while in the same "small room," the "large heart," of at least thirty* distinct instincts is contained—is surely enough to crush all thoughts of atheism and materialism, without calling in the aid of twelve heavy volumes of Bridgewater Treatises.

But we must hasten to end this too long paper. Its readers, generally, will be above that class to whom profit, immediate or remote, from bee-keeping, can be of any serious moment—though indeed profit lies in saving bees, not in killing them. But many prejudices have to be done away, and greater care bestowed, and better knowledge of their habits acquired, before the murdering system can be eradicated from the poor. It is for the better educated and more intelligent to set the example by the introduction and use of cheap and simple but better constructed hives—by personal interest taken in their bee-management—by recommending the best written books on the subject—above all by adopting the merciful system in their own gardens, and entrusting their hives to the special care of one, whose office it should be, not only to diligently tend and watch his master's stock, but also to instruct the neighboring cottagers and farmers in the most improved management. It would be an excellent plan to attach a stall of bees to the south wall of every

* Kirby and Spence. Introd. to Entomology, ii. 504:

farm-house with a glass side towards the interior, so that the operations of the bees might be watched from within. The custom of placing them within an arched recess in the wall of the house, was one of old Rome, and is still observed in some countries. We look upon this as a very pretty suggestion for a fancy cottage in any style of architecture. Perhaps the directors of normal schools could find no better way of teaching their pupil schoolmasters how to benefit and gain an influence among the parents of the children they will have to instruct, than to put them in the proper way of making and managing the lately introduced movable comb-hives, of taking honey, making artificial colonies, rearing queens, joining stocks, and hybernating the bees.

We said if any man would keep bees, he must make them his friends:—nay, that is a cold word—he must love them. De Gelieu makes the remark—which we have often heard before—of figs, and olives, and medlars, and truffles, or of an equivocal dish recommended by a host—that you must either like them very much or not at all. It was this love we suppose that led Mahomet to make an exception in their favor, when all other flies were condemned—that made Napoleon, who laughed at the English as a nation of shopkeepers, select this emblem of industry, in place of the idle lily.

“That tasks not one laborious hour.”

And Urban VIII. and Louis XII. adopted them as the device on their coat of arms, and Camdeo, the Cupid of Buddhism, strung his bow with bees. The Athenians ranked the introduction of the Bee among their great national blessings, tracing it up to Ccerops, “the friend of man”—the Attic Alfred; and such regard is still paid to them in many parts of the south of England, that no death, or birth, or marriage takes place in the family, without its being communicated to the bees, whose hive is covered, in the first case, with a piece of black cloth, and in the two latter, with red. The 10th of August is considered their day of Jubilee, and those which are seen working on that day are called Quakers. Omens were wont to be taken from their swarming: and their settling on the mouths of Plato and Pindar, was taken as a sure presage of the sweetness of their future eloquence and poetry; though these legends are somewhat spoiled by the same event being related of the infancy of Lucan and St. Ambrose, called, as was Vives afterwards, the Mellifluous Doctor. We all know of Nestor’s “honeyed words,” and Xenophon, “cujus sermo est melle dulcior.” Bees have not only dispersed a mob,

but defeated an Amurath with his Janissaries;* but it would be quite impossible, in a sketch like this, to give anything like a full account of their many honors and achievements, and of the extraordinary instinct displayed by them in every operation of their manifold works. Our object in these remarks has been rather to stimulate the novice in this subject, than to give a complete history of their habits, or to put forth any new discovery or system of our own. We have introduced our little friends with our best grace, and must leave them now to make the best of their way with our readers.

“So work the Honey Bees;

Creatures that by a rule in nature, teach
The art of order to a peopled kingdom.
They have a king, and officers of sorts:
Where some, like magistrates, correct at home;
Others, like merchants, venture trade abroad;
Others, like soldiers, armed in their stings,
Make boot upon the summer’s velvet buds;
Which pillage, they with merry march bring home
To the tent royal of their emperor:
Who, busied in his majesty, surveys
The singing masons building roofs of gold;
The civil citizens kneading up the honey;
The poor mechanic porters crowding in
Their heavy burdens at his narrow gate;
The sad-eyed justice, with his surly hum,
Delivering o’er to executors pale
The lazy, yawning drone.”


Henry V., a. 1, s. 2.

Who would not affirm from this and other incidental allusions, that Shakspeare had a hive of his own? Dr. Bowring has only been able to discover in them “galleries of art and schools of industry, and professors teaching eloquent lessons.” Perhaps our friend means Mechanics’ Institutes, and travelling lecturers.

*The Abbe della Rocca relates that “when Amurath, Turkish emperor, during a certain siege, had battered down part of the wall, and was about to take the town by assault, he found the breach defended by bees, many hives of which, the inhabitants had stationed on the ruins. The Janissaries, although the bravest soldiers in the Ottoman empire, durst not encounter this formidable line of defence, and refused to advance.”

BEES IN MISSOURI.

Mr. THOMAS ALLEN, of Crystal Springs, St. Louis, Mo., says that in that section of country, such is the mildness of the climate, that “bees are often tempted out of their hives in winter. Some years they begin to work in March, and I have taken full boxes of newly made honey as early as the fifth of May. The same hive will, in favorable seasons, bear robbing three times, and throw off perhaps three or four swarms of young bees.”


 Please send us the names of beekeepers.

Instinct and Reason.

Although many of the complicated actions of the Bee and other insects bear evidences of discrimination and emotion, and are of a decidedly higher character than those simple movements and operations performed by the creatures placed lower in the animal scale; and though it has hitherto been impossible to distinguish many of the former from truly rational acts, yet we do not consider the whole mental nature of these animated beings entitled to a higher designation than that of instinct. Notwithstanding that it foreshadows those psychical powers and faculties that become developed in the reasoning creatures, yet it wants at least one clearly defined quality which is now employed, as it appears to us, with great propriety, to stamp the nature of true reason; and that is *educability*.

Insects never improve in their mode of proceeding, nor excel one another in the ability with which they perform their labors. There never was a bee wiser than another bee; nor a generation of bees that effected improvements in the economy of the hive; and if we were able to suggest to the creatures an improved *modus operandi*, it is questionable whether any amount of teaching would have a perceptible effect upon them.

A careful consideration of the nature and phenomena of this *higher* phase of instinct, has suggested to us the designation of "*rational instinct*" as an appropriate one to denote its character; for as soon as the various creatures that are thus endowed attain the imago, or perfect state, they at once *instinctively* or intuitively perceive the relation between the various organs wherewith they are furnished and the materials on which they are intended to operate; and, without any experience or tuition, proceed at once to employ both organs and materials in a perfectly rational manner. This property is not susceptible of development. However complicated the actions resulting from it may be, they are, as a general rule, the same under all circumstances. In fact, a *negative* feature in "instinct" is the absence of *educability*.—SAMUELSON.

 If, in spring, a stock of bees is not very rich in honey, and much cold weather comes to hinder their work, they will be in great danger of being ruined and lost. The brood increasing, the old store spent, and none to be got abroad, they all perish together. Therefore, the stocks that are fullest of bees, without a sufficient store, are in the greatest danger.—DR. WARDER.

[For the "Bee Journal."]

MR. EDITOR:—If the few lines I send you have not already been anticipated in spirit in your Journal, perhaps they may be of service to some who use the Movable Comb Hive, in uniting two or more swarms.

My method of uniting is this:—I take one of the stocks, and after placing it on an empty box, smoke them sufficiently to keep them quiet while operating, and brush all the bees from the combs into the box. Then, after removing the empty hive, place the other swarm to be united on the box, and in the same manner brush the bees from the combs. The bees, being deprived of their combs, mingle peaceably. Now, adjust all the combs that are suitable in one of the hives, and place it on the stand where it is to remain; then, before the honey-board is put on, set the empty hive (without frames) over the hive containing combs, and shake or brush the bees from the box into this empty hive, when they will fall directly upon the combs. With a feather, they should be stirred to facilitate their occupying the combs. Remove the empty hive, adjust the honey-board and cap, and the thing is done. I have done this repeatedly, and have never known it to fail. I use no bottom board fastened to the hive.

I would here make a suggestion.—If both queens were removed, and an Italian queen given them before they are returned to the combs, would they not receive her without risk? Perhaps some of your readers will test the matter, and give the result of the experiment.

One thing I may add, that although the two united swarms agree perfectly, robber bees are not permitted to enter the hive; as the bees, upon being restored their treasure, seem more than usually watchful.

ARTHUR W. LUNDY.

Frenchtown, N. J. Sept. 18, 1861.

[For the "American Bee Journal."]

ITALIAN BEES.

About the 1st of August, 1861, I observed a stock of my bees, that had an Italian queen introduced the last of June, destroying the drones. I watched their actions for some time, and found invariably the young Italians engaged in this work. How is this? Is this duty always devolved on the young bees, or is it characteristic of the Italians? I have seen this stated by some to be the case.

I had an Italian stock, in August, that prepared to swarm (as stated in a former article), and had not two dozen mature drones or in any stage of development, the drone-cells being all filled with honey.

R. B. O.

New Berlin, Sept. 10, 1861.

The Dzierzon Theory.

BY THE BARON OF BERLEPSCH.

No. X.

I shall conclude these articles with a concise discussion of two or three interesting topics.

1. *Do drones subserve any secondary purpose?*

Having already shown that the drones are males, I may add, as the result of all my observations, my conviction that the sole design of their existence is, the fecundation of the queen bees. I certainly am not aware that they are of any other or further use. Only those who do not know, or unconsciously ignore the fact, that the drones are males designed to fertilize the queens, continue to speak of other purposes which they are supposed to subserve. Among these, is the production and maintenance of the degree of heat required, within the hive, for the perfect development of the worker-eggs and larvæ; and hence they assume the drones to be *brood-bees*, and so call them. It is scarcely possible any longer to treat such a notion seriously, since it has been so frequently and conclusively refuted. Still, a few remarks may not be altogether superfluous. During the precise period in the spring—from March to May—when, if such were their design even secondarily, drones would be most needed, none are to be found and none are produced in the colony—unless it be, occasionally, a solitary individual, evidently born out of due season. Afterwards, when the weather has become warm, when thousands upon thousands of larvæ have successfully matured, and the hive is crowded with young and fully-fledged workers, so densely packed that numbers are constrained, by want of room and the heat in the interior, to cluster on the outside of the hive, hordes of drones begin to make their appearance! When they *might* be needed and wanted, as a sort of animated heating apparatus, they are among the missing; and just when not needed; when their services, *in this respect*, could be best dispensed with; when, in fact, a *refrigerator* would be more desirable than a *heater*; legions of them emerge and crowd every avenue!! As well might it be alleged that the heat of a smelting furnace, on a summer's day, with the thermometer at 98° in the shade, has the designed secondary purpose of keeping the workmen warm!

But then modern utilitarian philosophy sagely inquires—"If the fecundation of the young queens be the sole purpose for which drones exist, why does Providence cause so many to be produced,

when one or a dozen would amply suffice? Would not this be counter to the known wise economy of nature, which does not permit the production of that which is of no use?" The usual reply to this is, that so large a number of drones is required, because, if only a few were provided, the queen might fail to encounter one in her excursions; and that these excursions are indispensable, since, to free the queen from perpetual annoyance by the rivalry of drones, it has been wisely ordered that sexual concourse shall not take place within the hive, but only on the wing and in the open air. But this is simply retorting on pseudo-rationalism by pseudo-rationalism. The reasoning is teleological, and I regard teleology even in theology (except where the revealed word warrants the inference with rigid mathematical strictness), as a presumptuous apotheosis of fallible human intellect. I would rather say—"the fact is simply so. God has so ordained that the queen bee and the drone can have concourse only after leaving the hive; and the production of a large number of drones, in a state of nature, must also be consistent with His Wisdom and Will, whose 'ways are past finding out.' He causes the fruit tree to produce millions of blossoms, and the anthers of those again shed myriads of sporules of fertilizing pollen, yet the result is the production of a comparatively small quantity of fruit, much of which again fails to perfect its seed." All this is so—the facts are patent to every observer. But it would be presumptuous arrogance and folly for finite man, with his limited faculties, to undertake to grasp them in all their unsearchable complexity, and presume to assign reasons for the multifarious operations of nature, as ordained by the infinite wisdom of the Creator. The facts must content us: we must be satisfied they are as they are, and not otherwise. Why they are so; and why God, since he has assigned only one queen to a colony, has not likewise allotted to her only one drone; and why he has not seen fit to allow the concourse to take place within the hive, I know as little as I know why he creates myriads of mites and millions of grasshoppers, or permits the hail and the hurricane to devastate the land. But this I know, that since God, who "doeth all things well," has so ordered it, it is well and wisely done.

2. *Are those drones which proceed from the eggs of fertile workers, virile males?*

Dzierzon first propounded this query, and answered it affirmatively—conceding their perfect virility. *Perhaps* I can furnish the evidence *a posteriori*. On the 2d of September, 1853, I broke

up a drone-producing colony, which I had expressly reserved in my apiary for investigation. I transferred to frames, the combs which contained from 800 to 1000 cells of brood in the various stages of development, and placed them in a Dzierzon hive. After immersing the bees in water, and carefully picking out and destroying all the drones, I introduced the bees and placed the hive in the bushy top of a willow tree, situated midway between my residence and the hamlet of Lower Doria—so arranging the dense foliage beneath, above, and around the hive, that it could not be seen. All the drones which thenceforward emerged, emanated from eggs laid by a fertile worker, for the colony had been queenless since the middle of June; and I presumed other drones would scarcely find their way thither at that season, as the nearest known apiary was at least a mile and a half distant. On the 14th of September, an unusually fine and warm day, I took from one of my colonies recently deprived of its queen, a sealed royal cell containing a maturing embryo, bedded it on cotton and carried it to the place where the hive was concealed. After satisfying myself that my proceedings had not been observed by any one, I ascended the tree, opened the hive, and inserted the royal cell in one of the combs. A considerable number of drones were then flying. Replacing the foliage, I so left the hive till the 30th of September, when I sent Günther for it. On his return we opened it, and soon found a queen, and also eggs and larvæ regularly placed in the cells. All the drone-brood had disappeared, the immature having doubtless been destroyed by the bees, when the young queen became fertile. On the 12th of October, young workers emerged.

This experiment was one of the few successful ones made by me in that year. Days so clear and calm and warm, as were those from the 13th to the 21st of September inclusive, rarely occur here so late in the season; and hence there was every reason to expect that the queen, if perfect herself, would become fertile—provided those drones were truly virile. I said the experiment was successful, though the result does not furnish *conclusive* proof of that which it was designed to demonstrate. For it happened that year, in my own apiary, contrary to all usage, that one of my colonies, though containing a fertile queen in every respect perfect, retained its drones till the month of November. And, since, in 1844, one of the three queens which I had secluded, without drones, a mile and a half from the nearest apiary, still became fully fertile, it is obviously *possible*, though perhaps scarcely probable, that in this latter case, a drone from my apiary and emanating from a

queen-laid egg, may have encountered and fertilized the young queen reared in the concealed hive. Again, it is also possible that a drone from one of the apiaries in Lower Doria may have found his way thither, though the distance is equally great. Both suppositions are highly improbable, but neither is impossible; and the result, consequently, is not *conclusive*.

3. Diminutive Drones.

By this term, I do not mean those drones which are merely somewhat smaller than the ordinary size, such as are occasionally seen, especially among those produced from the eggs of fertile workers; but such as are not longer than workers and scarcely perceptibly thicker. Some writers have mentioned cases where thousands of these diminutive drones are alleged to have been seen in queenless colonies. I shall raise no question about the number; but must take leave to deny that the colonies in which they were found, were queenless. They certainly had a drone-egg-laying queen. I have *never* seen the kind of diminutive drones to which I allude, in colonies producing drones only—whether the eggs were laid by an unfecundated or a superannuated queen, or by a fertile worker; but *always* and uniformly only in colonies in which the queen was able to lay worker-eggs also, and then only a few occasional specimens. I have always found the drones of drone-producing stocks, to be fully as large and as perfectly formed as those in colonies having a healthy, vigorous, fertile queen; and if, occasionally, one was seen somewhat less *bulky* or more *slender*, it was still, in every instance, of the full ordinary *length*. Worker-cells containing drone-brood, are always sealed with a more convex cap than drone-cells so supplied. Those cells, also, project considerably from the surface of the comb, and thus the larvæ can attain its full *length*. Lacking space, however, for *lateral* development, the drone-larvæ in worker-cells, while growing, exert a strong pressure against the sides of the cells—forcing most of them outwards and causing the destruction of some of the larvæ, in intermediate cells, in combs which were supplied with eggs in regular consecutive order. But most commonly, drone-brood is irregularly disposed in worker-comb, if the eggs were laid by a fertile worker; that is, the eggs are not placed uniformly, cell after cell, and row after row. In such case, the larvæ have or obtain ample room for *lateral* development, because there is little resistance to the pressure exerted against the cell-walls, and the drones emerge of full size. In some instances, also, though the drone-brood is placed in contigu-

ous worker-cells, the lateral pressure is not sufficient to cause the death of the compressed larvæ, and when those emerge, they will be somewhat *more slender* than the others, but nevertheless of *full length*.

None of these, however, are of the class to which I refer—diminutive drones of the size of ordinary workers. These, as I have stated, are always found few in number—rare individual specimens—in colonies having a queen that lays worker-eggs also. They are met with mostly in the spring, and seldom in summer; and invariably the colony producing such, speedily becomes queenless, if it does not seasonably rear a young queen. These drones are produced, here and there, in worker-combs, and their cells are sealed over with a *flat* cover, like those containing worker-brood, or at least the convexity is so slight as to be hardly observable, and what there is, may be the result of pressure from the drone's head, rather than of original construction. This *flat* capping is the cause of their diminutive size, restricting their *length* to that of an ordinary worker. They are slightly thicker than workers, as during their growth, they also exert some degree of pressure against the side walls of their cells. *The greater number of them perish just before reaching maturity.* In 1846, I found a few such diminutive drones in February, on the bottom board of a colony, among some immature worker-larvæ, which had been cast out of their cells by the bees; and these showed that the colony contained a normal queen. I could not, at the time, satisfactorily account for the phenomenon presented by the existence of worker and drone-brood simultaneously in a colony, so early in the year, and, therefore, broke up the stock for examination. I found a queen exhibiting nothing remarkable in her appearance. The combs contained comparatively only a small amount of brood, and this was not very regularly placed. I opened all the sealed cells with the point of a needle, and discovered a number of drone nymphs in the worker-cells, interspersed among those containing worker nymphs—all uniformly sealed with *FLAT* covers. I was now as much in the dark as ever. I transferred the queen and bees into a hive in which a colony had perished the previous winter. When the gathering season opened and the rape fields were in bloom, I found the combs well charged with drone-brood in worker-cells *sealed with highly convex caps*, and *full-sized drones* were flying in great numbers. No worker brood was to be seen. The queen was still alive and alert. Having then still full faith in the existence of special drone-mothers in every colony, my observations left me

in the dark. Freed now, by the aid of Dzierzon, from that delusion, I have adopted the following hypothesis respecting the origination of the diminutive drones, based on what has come under my notice at various times. I suppose that when the supply of spermatie filaments in the liquid contents of the queen's spermatheca is nearly exhausted, she is no longer able to impregnate every egg she lays. But, being unconscious of her partial disability in this respect, she continues to oviposit in worker combs as theretofore, and thus some unimpregnated eggs chance to be deposited in cells, interspersed among those containing eggs duly fertilized. The former, of course, develop as drones; but their true character being unsuspected or undetected by the workers, their cells are capped with a *flat* cover. Thus cribbed in on all sides, their growth is repressed—the more rapid and vigorous progress of the worker-larvæ by which they are surrounded, preventing *lateral* expansion, while the *flat* cap precludes longitudinal extension. In this manner, I conceive, do these diminutive drones originate. The larger number, however, perish prematurely in their cells, being unable, from the peculiar structure of their mandibles, to perforate the *flat* cover by which they are confined.

I designate this as a *hypothesis*, because it is in reality nothing more. I shall embrace the first opportunity which the appearance of such diminutive drones in any of my colonies furnishes, to catch the queen and have her dissected. Should it be found that there are only few, or comparatively few, spermatie filaments remaining in the contents of her spermatheca, the fact would at least confer additional plausibility on this hypothesis.

ADDENDUM.

Commenting on the Baron of Berlepsch's ninth article, in which he treats of the time required for the perfect development of the queen bee, Dzierzon makes the following remarks:—

“The widely differing statements on this topic, given by various careful observers, result from their neglect to designate the precise time from which they began to count. We may date from the moment when the egg is laid; or from that at which it is hatched and the larva disclosed; or from the time when the larva is selected by the bees, for the production of a queen; and we should thus reach different conclusions. Again, you count from the laying of the egg to the time when the young queen leaves the cell. But even this term allows of considerable latitude, and does not fix the precise time required for the maturing of the insect. Circumstances may cause a young queen

to leave her cell while she is yet very tender and only partially colored, or induce her to remain therein several days after she is fully developed. The regularity with which the brooding is conducted, and the average temperature prevailing in the hive during the time, influence the process very materially and may shorten or prolong the period.

You state that I have heard a young queen teet on the eleventh day. That is a mistake: such is not the correct import of my expression. I have indeed found young queens *emerged* as early as that, but always in so delicate a condition, that twenty-four hours more were certainly required to give their physical organism sufficient rigidity to produce sounds audible by the human ear. As you have yourself heard them teeting on the twelfth day, there is no radical difference between our observations.

In my apiaries, the first afterswarm has frequently issued on the fifteenth day, but most commonly on the fourteenth. For the rearing of queens, bees sometimes select larvæ and sometimes eggs; the choice being determined apparently by the more or less favorable position of either, near the edge of a comb or of one of the passage openings, thus permitting the construction of royal cells without involving the destruction of other brood cells. Ofttimes, when preparing to expel a swarm from a box or basket hive, I have pruned off the lower portion of the combs, till the cells containing unsealed larvæ were reached; and have usually found that the royal cells were built along these cuts, close together, and extending downward so as to resemble the fingers of a glove.

That the queen emerges about three days earlier than the worker, was proved to my satisfaction by the following experiment. I inserted an empty worker comb in the brooding chamber of a populous hive, and three days after, when it was well supplied with eggs and some of these had already been hatched, I transferred it to an artificial colony, in order to have queens reared. The bees built four royal cells on the lower margin of the comb, among the cells which contained only eggs when the transfer was made. Nevertheless the first queen emerged two days sooner than the workers in the central portion of the comb, though the eggs there were laid at least one day earlier. Nor can a higher temperature in this case have caused the difference, since the worker brood in the cells adjoining the royal cells, enjoyed the same degree of heat as the latter, though it emerged much later. During the closing period of development, the maturing of the royal embryo proceeds with accelerated rapidity. When a royal nymph

begins to assume a brownish hue, she will certainly be ready to leave her cell within forty-eight hours, if the ordinary temperature be maintained. Royal cells may also be slightly opened for the inspection of their contents; and if they be carefully closed again, so as not to tempt the workers to destroy them, the development of the embryo will not be prevented thereby—the queen will still emerge, full-fledged and active.

Seventeen days from the laying of the egg seem to me sufficient for the perfect development of a queen, provided the temperature is suitable and equable, and the brooding regularly continued. Though the result of your experiment with the nucleus of July 6, 1851, showed fully eighteen days, it may be remarked that the bees, suddenly deprived of their queen, may, in consequence of that disturbance, have omitted for a short time to cover the brood properly; and as the colony was weak and there was, therefore, a deficiency of heat, the larvæ doubtless developed more slowly than they would have done under more propitious circumstances. That such lack of warmth, and intermitted brooding would tend to check or procrastinate the development of an embryo queen, is sufficiently obvious. Hence, royal cells occasionally remain closed for an unusually protracted period. Delay in emerging may also, at times, be intentional—the young queen, though fully mature, dreading to encounter a rival, and keeping perdue till assured that she can issue with safety.

(For the "Bee Journal.")

It strikes me that the theory lately broached by Mr. Kirby (if I comprehend it,) is not altogether *new*, though it may be original with him. I think it is essentially similar to that advanced about a hundred and twenty-five years ago by the Rev. Mr. Purchas, in England, who says—"into the royal cells is injected a *spermy matter*, inclining to yellow, in which and out of which the queen bee is bred, being both matter of *generation* and *augmentation*."—THEATRE OF POLITY, chap. 8. The only material difference between the two, that I can see, is that Mr. Kirby concedes that the queen originates from an egg, while Mr. Purchas contends that "the golden matter of which the queen is made, is not turned into a worm, but immediately receives the shape of a bee. She is at first, (when she is visibly anything,) a perfect bee, in lineaments and shape, though not in magnitude and dimensions."

These theories involve a principle which wants sufficient evidence for its support; and assume as a fact the existence of *spermy* matter in the cells, which their originators have not proved can be found there, and which no one else has yet been able to discover.

Hartford.

J. T.

[For the Bee Journal.]

The Italian Bee.

As many are engaged just now rearing Italian queens and bees, I would suggest that they write for the Journal the result of their observations, to the end that we may compare notes and see if thereby we may not be able to arrive at some facts, which may determine a few points in the economy of the hive, now confessedly involved in much doubt. Every one, so far as is known to myself, who are or have been engaged in rearing this bee, either here or in the old country, have noticed the great *want of uniformity in color of queens*, and not only this, but have also noticed that the *progeny* of some queens are much lighter than others, even while *all* show the distinctive marks of the Italian race. Mr. E. Kirby argues that the *workers*, in rearing queens from worker eggs, procure the drone semen, and feeding it with the royal larvæ, (or does he maintain it is the royal larvæ?) give a taint of the race from which it is obtained, to the new queen. I am disposed to doubt the correctness of his theory, for reasons which I shall presently give; but that *queens of all colors*, producing *workers and drones* of different grades of color, can by any possibility be pure Italian, I, with him, very much doubt. My own idea about it is, that the bees, in transforming a worker-larvæ into a queen, give her (the new queen) a pigment, so to speak, or taint of their own race. *How* this is done, I do not pretend to have discovered; but I have repeatedly taken pure Italian brood from an Italian hive, in comb of their own construction, and given it to the black race for the purpose of rearing queens. I have *uniformly* reared, in this way, queens of only ordinary or inferior colorings, while *their progeny* show a decided degeneracy from the original colony, although *all*, according to our accepted tests, are Italian.

In rearing queens by Italian bees, in their own hives, I as *uniformly* get finely marked queens. Some of these prove hybrid, on account of the proximity of my apiary to other bees; but those showing Italian marks are as fine as the original, while such as are purely impregnated, prove fully equal to any, and even finer still than the parent stock. Indeed, I have been, and am now, *increasingly* of the opinion, that *none are absolutely pure*, and if not, then they are susceptible of *improvement*; but to do this, something is yet wanting, if I am right in my conjectures. From my observations thus far, I am of the opinion that a queen of a certain grade, impregnated by a drone of the black race, produces progeny substantially similar

to herself in part, while a part partake of the other parent; and if such a queen happen to meet a drone of the same grade with herself, then *all* show Italian markings, but less distinctively and beautifully than if *both* parents were of greater purity. Of course, if I am correct above, then the old theory falls to the ground, and *very great* care will be requisite to preserve and improve the Italian bee in this country.

In regard to the theory of Mr. Kirby, I have placed Italian and common hives in close proximity to each other, and several times reared queens, by transfer of Italian brood from the Italian hive to that of the black race. No *drones* were in the latter, and yet, while I *uniformly* got finely colored queens from the Italian hive, I as *uniformly* obtained only queens of indifferent or dark color from the black bees. If the bees obtained the *drone semen* while on the wing, as he alleges, why should the *queen* be differently colored in the different hives, since *all* would meet the same drones in their excursions? Again, he states that if a queen be disabled in one of her hinder legs, it will be impossible for her to copulate with the drones. On the 4th of July, while inspecting a colony, I found a young queen had emerged, minus one hind leg; I had not then seen Mr. Kirby's article, but felt chagrined at noticing her clumsiness, as she was a *very fine* queen; fearing that in consequence of her deformity, she might be lost. I was agreeably surprised, however, on the 7th—three days later—on opening the hive, in discovering that she had become fertile, having filled at least a square foot of comb with eggs. If Mr. Kirby, or any one else, will procure a good microscope and take a drone, obtaining its semen in the way he indicates and examine it, he will discover it filled with *millions of minute animalculæ*. Now, let him compare with this *the contents of a queen cell, at all stages of development*, and if he finds the *LEAST TRACE* of them, then I will give up. But there are no such things to be found in a queen cell, nor within a queen, till after her impregnation. Then, her sperm sac will, under the microscope, be found filled with *millions of them*.

MARTIN METCALF.

Grand Rapids, Michigan, July, 1861.

Mr. OTTO HEMMAN, of Weissenfels, states in the *Bienenzeitung*, that of twelve royal cells built on a comb supplied with eggs by a queen which died of superannuation a few days after, *nine* proved to contain dead drone-larvæ. It seems evident from this, that few spermatozooids remained in her seminal sac; and hence she unconsciously deposited drone or unimpregnated eggs in the worker cells.

[For the "Bee Journal."]

SERIAL publications devoted to a special department of rural economy, are too apt to be poorly sustained, and in many instances they have been obliged to discontinue. As important as the wool and stock interest has been to our country, it is only within a few years that a journal adapted to this particular branch of husbandry, has been for any length of time fully sustained. Even in England, where greater interest is manifested in all rural subjects, than in our own country, the "Poultry Chronicle," which was edited by a lady and conducted with considerable energy, was issued but for a short time. We wonder, with the rage for fancy fowls manifested by our countrymen, that no *Poultry Journal* has been attempted by some enterprising publisher. Periodicals devoted to gardening and horticulture, have, perhaps, succeeded as well as any devoted to a special object, and we have three or four honorable examples of this character. The fact is, our farmers usually take two or three agricultural journals, and these embrace most topics relating to rural affairs and farm life; hence, there is so little interest in receiving a work especially devoted to any one branch.

THE AMERICAN BEE JOURNAL is a publication, devoted to the special department of Bee Culture, claiming from the beekeepers of our country a welcome support, which it most surely merits. From its first issue, I have read the numbers with a peculiar interest, and, I must say, I have been somewhat surprised to see the spirit, life and variety exhibited in its articles, selected and original, and all about the "little busy bee."

To the first establishment of such a publication, and especially at such a time as the present, there are many disadvantages and drawbacks to contend against, which those only know who have had experience in conducting works of this class. But as far as it has gone, it has shown that such a publication was needed, and if it were to be discontinued now, the thousands of intelligent and practical beekeepers all over our country, would sustain a loss such as only another work of the same kind could make up.

The first intimation I had that a journal about Bees was wanted, was contained in a query in the COUNTRY GENTLEMAN, Albany, N. Y., vol. XII, (1858,) p. 33, where W. J. E. asks, "could you not publish a cheap monthly periodical on Bees, in which the natural history and culture of bees could be discussed? Perhaps Quinby, Langstroth and others would be willing to furnish you with matter." After replying that they would be happy to publish all articles relating to bee culture

in their columns, the editors say: "It would, we imagine, be a difficult matter, to say nothing of the support it would receive, to fill a monthly sheet with valuable contributions on the management of bees." But here it is, only two years after the above was written, and we have a practical and reliable BEE JOURNAL, filled each month with interesting and valuable articles upon the management of bees. And why should we not have such a publication? Surely the seventy thousand beekeepers in our country can maintain one. The subject is one of intense interest, the occupation is one of profit, and the BEE JOURNAL becomes as indispensable to those who have but a few hives, as to those who have extensive apiaries.

I promise you, for another number, some remarks upon beekeeping as a favorable pursuit for persons in humble circumstances.

Brookdale Farm, Maine.

S. L. B.

[For the Bee Journal.]

BATTLE OF HONEY AND HUMBLE BEES.

As a contribution to the record of strange incidents, singular facts, and rare occurrences connected with the natural history of the bee, I send you the following article, cut from the "*Monmouth Merlin*" of September 19, 1846.

"On Thursday afternoon, the 18th instant, a farmer in the neighborhood of Twyn Barlwm mountain, in Wales, was watching his flocks, when suddenly his attention was attracted by a buzzing noise, and a cloud of insects which almost darkened the air. Upon closer examination, he found the multitude engaged in serious warfare, which lasted a considerable time, until heaps of the vanquished covered the ground, some without heads, others minus their wings, and others completely separated into two parts. They proved to be different sorts of the humble bee and the honey bee. A friend assured us that he scraped together three or four bushels of dead with his foot, and many persons carried away the slain in small basketsful, to show their friends the result of this very unaccountable warfare."

Coudersport, Pa.

A. J. D.

(For the "Bee Journal.")

RED CLOVER.

I noticed in August and the beginning of September, while the bees were gathering honey from the buckwheat, that they obtained pollen of a brownish color from some source. On investigating the matter, I found that they collected it from the red clover. This somewhat surprised me, as I had never seen them gathering honey from the red clover to such an extent; particularly while other forage was plenty. It is true I have seen a few, in the fore part of summer, at the red clover; but they were very few. I have also noticed that the bees visited only those heads that were imperfect, the tubes being shorter in consequence.

New Berlin.

R. B. O.

Food of the Larvæ.

It is an interesting inquiry, and one which has long engaged the attention of beekeepers, whether the larvæ of the different kinds of bees receive the same kind and quality of food, or whether the workers, the drones, and the queens respectively have each a distinct and peculiar pabulum administered to them. Pliny, one of the earliest writers who adverts to the subject, referred the brighter colors which distinguish the queen to the nutriment which she receives in her larva state, being composed, as he conceived, of the choicest essences of flowers. And the notion that her food was specially refined, highly aromatic, and exceedingly nutritious, seems to have so captivated the popular fancy, that nearly all the ancient writers and apiarists adopted it. The marvel is that while bees have been classified in almost every imaginable manner, as architects, wax-workers, varnishers, plasterers, judges, executioners, sextons, scavengers, scouts, guides, guards, nurses, &c., &c., to the end of the chapter, no one has ever thought of looking among them for confectioners and cooks, with the special function and prerogative of purveying for the taste and appetite of the humming household; and from whose science and skill hints might be derived for improving and perfecting our own *cousine*. Had they made themselves conversant with the mysteries of the hive, even Appert, Kitchener and Ude might possibly have lengthened out their heritage of fame a lustrum or two, by devising some novel *pate* or marmalade sufficiently delicious and piquant to have tickled the palate of an *Apicius*.

But—to get back to our potage, or rather that of the bees—some apiarists have tasted the jelly or paste on which the larvæ of workers and queens subsist, and endeavored to discover and attempted to describe the difference between the two; but failed to convey any adequate notion thereof to those whom they sought to edify and instruct. Others, doubtless lacking the exquisite palate of the bee, declared that the jelly aforesaid was a miserable, insipid, unsavory concoction, which, though it might be swallowed with gusto by vermicular gluttons, was far inferior to vermicelli or turtle-soup, and could never excite a tang on the tongue of an epicure. "*De gustibus non est disputandum*;" and we shall not undertake to "decide, when doctors disagree."

Now, seriously and *seriatim*. Huber speaks of a pure royal jelly, smooth, tart, and pungent. The Rev. Mr. Christ describes it as sweetish and spicy. De Morlot calls it spicy and subacid, well calculated to sharpen the appetite and promote diges-

tion and assimilation; and says that, compared with it, the food furnished to the worker larvæ is merely an insipid paste somewhat like that used by bookbinders. Hofman says it has an acid taste, and resembles in appearance thickly boiled starch. Berlepsch describes it as an amorphous, viscid, mucilagenous, tasteless substance; but does not think with Dzierzon, that there is no difference in quality between what is fed to the royal larvæ and that which the worker larvæ receive, so long as the latter remains coiled on the bottom of the cell. Dr. Barth regards the royal jelly as differing not only quantitatively but qualitatively also, from the food of the worker larvæ. He says the former is white with a faint tinge of yellow, and is somewhat viscid or pasty; while the latter is nearly as clear as water, having only a slightly milky hue. Reaumur does not allude to any difference between the two. According to him the substance on which all the larvæ are fed is at first nearly insipid, but gradually receives an accession of sweetness and acescency. Dr. Bevan contents himself with adopting or at least quoting Reaumur's opinion. What Butler thought of it we do not remember. Thorley tells us that the queens are reared in "oblong orbicular cells," and that the larvæ therein are nourished "by a very select and peculiar matter gathered by the commons. What the said matter is, or whence it is gathered, is not easy to determine. Yet that it is really peculiar, and very different from that gross matter, which is employed in nourishing the other young, I cannot but conclude from what I have taken out of the royal cells, of a very different kind and quality; being of a gummy, glutinous nature; of a deep red, transparent; and would rather dissolve and melt in the fire, than crumble to powder." Debeauvys speaks of it as having a decided subacid taste. He, being a Frenchman and of course a *gourmand*, doubtless skilled in the mysteries of gastronomy and trained to appreciate nicely the flavor of such *vienne de hautgoût*, we conclude by most complaisantly deferring to his judgment and considering this matter of *taste* settled beyond appeal.

Bruning believes that the royal larvæ are supplied not only with a much larger allowance of food, but that what is allotted to them is of a more nutritive quality. Scholtiz insists that while they receive much more ample supplies, these are of a peculiarly stimulating character, causing the entire organism of the queen to reach early the perfection of which it is susceptible—the ovaries especially to become fully developed. Dr. Dönhoff regards the obvious difference in the composition of the food prepared, as of great significance, in-

fluencing directly the greater or less complete development of the sexual organs. He states that during the first six days the royal, the worker, and the drone larvæ are fed with the same kind and quality of food, the first only receiving a much more lavish supply, so that it in fact swims in it. Thenceforward, while no change is made either in quality or quantity, in what is appropriated to the royal larva, a large admixture of pollen is introduced into that given to the worker and the drone larvæ. And he remarks as an important fact that, on the sixth day—precisely coincident with this change in the food,—the first faint traces of sexual organs can be discovered in the larvæ. He infers that the object and effect of the change is to check the further development of those organs in the worker. He regards pollen as detracting from the nutritious quality of the food, and rendering it less stimulating. This view comports altogether with the observations of Dzierzon, Berlepsch and others, that queens may be reared from worker larvæ up to the sixth day of their existence as such; and it thus appears that the repression of sexual development is contemporaneous with the admixture of pollen in the food. Prof. Leuckart concludes that these stand to each other in the relation of cause and effect—more especially, as sexual development becomes perfected in the royal larvæ, which is continuously fed on the unadulterated or undeteriorated food. These effects however seem to be restricted to the worker larvæ; for in the drone, which is believed to be fed throughout—though somewhat more liberally—with the same kind of food as the nascent worker, the sexual organs do nevertheless become perfectly developed. Nay, if a drone larvæ happens to be placed in a royal cell and is fed correspondingly, it invariably perishes—being “drugged to death” by the very pabulum which carries up the worker larvæ to the acme of perfection in development and organization, and advances it substantially to a higher stage of existence. No explanation of this singular fact has yet been given, though it serves to illustrate the adage that “what is one man’s meat is another man’s poison.”

Berlepsch regards as untenable, though ingenious, the theory of Dr. Dönhoff and Prof. Leuckart, that the undeveloped sexuality of the workers, results from the introduction of pollen in their food while they are yet in the larvæ state. Since it has been demonstrated that common workers are produced in colonies which have not a particle of pollen in their hives, and at a time when the bees cannot gather any, he conceives it manifest that the pollen which the worker larvæ receives in its food cannot serve to check sexual development.

Were pollen essential to this repression, he concludes that the bees produced while there is a total want of it in hive, would not be workers, but *diminutive queens*. But it is by no means easy to determine when there is an entire absence of pollen, or its essential equivalent, in the hive. There may not be a particle of it discoverable in the cells, and yet a store of it amply sufficient for the needs of the larvæ, may be repositied in the stomachs of the workers or their general organism. Berlepsch inclines to look for the cause rather in the comparatively sparse supply of food which the worker larvæ receive, and in the *honey* which is fed to them on the day before their cells are capped.

Such, and so various, are the opinions of those who have touched, tasted, and handled the daily bread of the infant bee!

[For the Bee Journal.]

About the middle of June, I removed the queen of a common stock, using her in forming an artificial colony, and inserting a royal cell containing an Italian embryo queen, nearly mature, in the hive from which I removed the queen. Next day, I found that the young queen had emerged and was kindly received. It never occurred to me that this colony might send forth a swarm, and I was therefore disagreeably surprised to find one issuing from it on the fourteenth day after the removal of the original queen. When introducing the swarm in a movable comb hive, I observed that the Italian queen was closely enveloped by a small cluster of bees, from which I liberated her. Scarcely had the swarm taken possession of the hive, when I found the queen on the bottom encompassed by another small cluster. I again liberated her, and then returned her to the parent hive, which she readily entered, and where she was joyfully received. I examined the hive daily, but found no eggs till the eleventh day; and from these, beautiful Italian workers afterwards emerged. I also examined the swarm repeatedly, and discovered that it contained a common queen, which had doubtless issued from her cell while the bees were departing, and accompanied the swarm. But why did the bees prefer the to them then yet unknown common queen? And why did they reject the Italian queen with which they had been familiar for thirteen days? I incline to solve these questions, by supposing that they regarded it doubtful whether a queen which had not begun to lay within this protracted period, would ever become fertile, and turned more hopefully to the younger just emerged stranger. Or did the community of race induce them to give her the preference?

D. H.

[For the Bee Journal.]

ON THE HYBRIDIZING OF THE BLACK AND ITALIAN BEE.

Truth is never made less by investigation, and by it knowledge is attained and errors exposed; and this becomes particularly truthful when applied to bees and their culture.

In the January No. of the Bee Journal, page 16, there is an article by the Rev. Geo. Kleine, giving a history of the Italian bee in Germany, and the effects of their hybridizing with the common or black bee, which contains much useful information in reference to mixed breeds of bees, but the question as to *how* they become mixed he has left somewhat enveloped in mystery.

By strict observation of the natural habits of the bees in their reproduction I have come to a different conclusion from other writers on this subject. I believe that the Author of Nature has established a principle in their seed, or the laws of their reproduction, which forms the three distinct kinds in their physiological organism and their propensities. I do not believe that the food or size of the cells have anything to do with the formation of their sexes. I do believe that the queen, workers and drones are made such by impregnation at particular times: first, to form the queen; second, her ovary, to form drones; third, the egg deposited from the drones in the queen's spermatheca, to form workers.

I have yet to learn that a pure Italian queen can be perfected artificially, in a hive or nuclei of black bees and drones, by eggs of an Italian queen laid in the comb of said black bees. They will be made mongrel, by the semen of the common drones. Dzierzon says, on page 18, "the fragmental dash of foreign blood exhibits itself *especially* in queens." Now it seems to me that what he considered as a phenomenon would easily have revealed itself to his mind, had he considered and allowed the fact that it requires the drone's semen to perfect the royal larvæ and immature queen, which would give the "fragmental dash" spoken of, to the whole progeny.

Dzierzon could not account for the phenomenon—that the hybrid queens, either Italian or black, produced progenies that were half each, not only in kind but in number; while a portion only were of a clearly mixed or mongrel breed. Likewise it occasionally occurs when pure Italian queens, fecundated by black drones, produce a brood of the one variety or the other.

Rev. Geo. Kleine, after giving Berlepsch's opinion on hybridizing, says, the cause of the phenomenon referred to is to be sought for in the fact that some of the queens were genuine and others mongrel,

some to a greater and some to a less extent. My advice would be to seek for it also in the drone's semen used in perfecting young queens.

I will now give an explanation of my theory by which hybrids are made: 1st, it is well known that the copulation between the Italian queen and black drone produces hybrid workers. Also, worker larvæ of such queens taken to perfect queens would also produce mongrels. I will suppose that a colony of Italian and black bees are placed near each other, and each have young queens to be impregnated. As they fly out to meet the drones, they will meet those of an opposite kind, in which case their progeny would be mongrel; some in their marking *appearing* to be genuine; some resembling one kind and some the other; but all of them are mongrels. As it often happens that they leave the hive on their flights on several days, we suppose, for illustration, that the next meeting of this queen takes place with a pure drone of her own species. The result of this meeting is a progeny pure of her own kind; and the final result is, a brood from the same queen is made up of both genuine pure stock and mongrels; and the finding of such progeny has been a question which has long puzzled the Germans, as to how came they so. The workers carrying the semen to the hives promiscuously, may affect the progeny.

The physiology of reproduction is such that the seed of the male will impregnate certain ovaries in females that produce their progeny in broods; and the seed of two different males in the same female never blend together. We have illustrations of this in the canine species and our common fowls; the female, at the same litter, producing genuine and half breeds; and we now have the same results in bees. I have endeavored to avoid repetitions of what I have before written, and will close by calling your attention to one word, which is incorrectly inserted in my article on page 152, in July No., in line 24 substitute *well* for *not*, so as to read—how the queen obtains semen in her spermatheca is *well* known. E. KIRBY.

Henrietta, N. Y., July, 1861.

When the larva of the bee is arrived at a certain bigness or stature, the bees closely seal it up, taking no further care about it than by a natural heat to cherish the brood and hasten its birth. There it lies hid from the eyes of all living, seems to be entombed and buried in its grave, without the least sign of life. Yet, have patience, and you shall see the noble creature rising as it were from the dead, perfect in all its parts, and in the most beautiful form, far more glorious than that laid down. A most lively emblem or image of the resurrection!—THORLEY.

Queen or No Queen?

In common hives, from which the combs cannot be lifted for examination, it is, at times, exceedingly difficult to ascertain, as early as is desirable, whether the colony has succeeded in raising a queen, after the old one has departed with the first swarm. This is the case, particularly where the beekeeper is a timid spectator and unaccustomed to lifting his hives and inspecting the condition of the combs. Forty years ago, Knauff published the following method of determining the fact, and Judge Busch recently stated that he has frequently tried it, and always found it reliable.

"Early on the morning of the twenty-eighth day after the first swarm has issued, accompanied by the queen, tilt up the hive gently from one side. If the drones are then seen crowded together on the bottom board, the colony contains a fertile queen engaged in supplying the cells with eggs. If the drones are not so seen there, the colony is queenless. This should be done about five o'clock on the morning of the specified day."

Judge Busch adds—"If, after swarming, the parent hive be removed to a new location and the swarm placed in its stead (as is my invariable practice), the indication above referred to may be looked for at a much earlier period. The parent colony then loses suddenly so large a portion of its population, that all the royal cells, save one, are immediately destroyed, and the young queen will become fertile much sooner than if after-swarming be permitted. Generally, especially if the weather be bad, the expulsion of the drones will commence in about two weeks after the swarming and the removal of the parent hive; and if this hive be lifted early on the morning of the fourteenth day, the drones will be found crowded on the bottom board, if the colony has been successful in rearing a queen and she has become fertile. The workers will then no longer tolerate the drones in the upper part of the hive, or in the vicinity of their stores, but drive them down, preparatory to their forcible expulsion."

All this is of course needless where movable comb hives are used; but it may be of service to those beekeepers who still retain the old-fashioned hives. It is always important to know, at the earliest moment, the real condition of a colony which has sent forth a swarm, so that if it prove to be queenless, it may forthwith be supplied with eggs and larvæ, have a sealed royal cell inserted, or be provided with a fertile queen from the nuclei kept in reserve.

[For the Bee Journal.]

A brief chapter of the present season's experience will, I think, explain the "mystery" of your correspondent, M. M. Baldrige.

I had a beautiful Italian queen to remain unimpregnated. A very slight defect in one wing was the only apparent cause. After several weeks the only brood the hive contained was a piece four or five inches in diameter, of drone brood, in worker cells. These were greatly elongated, each cell rounded out and intermediate one vacant, apparently to give room for the enlargement. The queen was removed and three royal cells were immediately constructed, one near the edge of this circle of drone brood, and two near the middle. These two, on being extended had their upper sides attached to a slender stick of wood, which had been placed horizontally on the next frame, to hold the comb in place. The removal of this frame after the cells were sealed exposed two large sized larvæ with an abundant supply of royal food. The third one remained, and being to all appearance a perfect royal cell, I watched it with great interest expecting to be possessed of a royal drone, and was planning how I could have one of my finest Italian queens impregnated by it. The time soon passed when this new-born prodigy should have made its appearance, and on opening the cell I found what I should say was a half developed chrysalis, in a state of partial decay. The head was quite distinct but small.

In the case described by Mr. Baldrige, it was not known what was produced. From these facts I conclude it was an attempt by the bees to rear a queen from the drone larvæ of an unimpregnated queen. Neither is it entirely singular that this should have occurred in a hive possessing a queen, which appears to have been the case, according to the statement. Nor is it very remarkable, if that was the only egg the queen had laid, as most cases prove that, under the circumstance, the number is quite small.

L. PERCE.

Ercildoun, Sep. 10th.

When the combs in a hive are built or placed longitudinally from front to rear, it is termed the *cold arrangement*. When built or placed transversely or from side to side across the hive, it is termed the *warm arrangement*. And when they run diagonally, it is termed the *intermediate or irregular arrangement*.

The *cold arrangement* is usually preferred, as affording the best facilities for the labors of the bees, allowing them the readiest access to their stores in winter, and best promoting the proper ventilation of the hive.

Please send us names of beekeepers.

[For the Bee Journal.]

Bees Destroying their Brood.

J. F. Martin, on page 209 of the Bee Journal, asks the cause of a colony of his killing its young and removing them from the hive. He states he has "examined the hive and found nothing the matter." It would have been more satisfactory if Mr. M. had given the exact condition of the swarm—its strength, amount of stores accumulated, amount of brood, the state of honey resources at the time, and the weather.

I have noticed this destruction in several instances, and attributed it to various causes:

1st. Last September I removed a hybridized Italian queen from a Langstroth hive, and put her with the bees that were upon the frame with her, in a small box holding ten frames five inches square, and wintered them successfully in it. I filled the frames with empty worker comb, except two, which contained sealed brood, which I consider important to give, to maintain the strength of the colony; without which a nucleus (especially if engaged in raising a queen), unless very strong, will become too weak before it has hatched brood of its own. This is more important late than early in the season. I fed them sparingly every day, and in a few days the combs were mostly filled with eggs. I then fed more lavishly, and the bees began displacing eggs and larvæ to fill the brood cells with honey; showing their instinct for storing honey to be greater than their love of young. This would be a costly experiment with a large colony. M. M. Baldrige, of Niagara Co., N. Y., had this destruction of young occur early in the season last year, with a powerful stock that he neglected to supply with surplus boxes; and sent an account of it to the "American Agriculturist." Massacre from this cause must be of rare occurrence, for bees generally swarm when their hive is well filled with stores, harvest good, and they are crowded for room.

As bees do not leave the hive until a week old, and do not gather honey the first fortnight of their life, the few old bees that remain after a swarm has issued, generally do not much more than supply the wants of the young bees and larvæ for a fortnight to come; which gives the young queen a favorable opportunity to increase her army of workers, by depositing in the recently vacated cells.

2d. Bees, when on the brink of starvation in spring, will sometimes destroy their brood, sucking dry the bodies of the larvæ. The queen then almost ceases to lay, and desertion or starvation follows, unless they are assisted. I mention spring,

being the only season I ever remarked it, but I see no reason why they may not do so at other times, if brought into the same condition; which may happen at any season by robbing.


3d. It sometimes occurs that a weak colony extends its brood over more comb than it can cover and keep warm, when surprised by a sudden change of temperature, which, when it lasts for several days, is sure to kill the brood in the unprotected combs. The same thing sometimes occurs when a colony is placed in too large a hive for its strength. Also if, in removing frames containing brood, they are not replaced as found, but store-combs placed between. Thus isolated, if the colony is too weak to cover them all, the eggs and larvæ will be either neglected or removed from the unprotected comb or combs. When neglected, an intolerable stench arises from dead brood, which infects the hive for some time.

4th. Bees so build their comb that they can command every cell, and if in removing comb, it is not replaced in its original position, wherever it is winding and comes in unnatural contact or nearness to the next, the workers will cut a passage so that they can command every cell, generally leaving some points or lines of attachment. If the cells thus out of line contain eggs or brood in any stage of development, they are sacrificed to the science of bee-architecture.

I once, in searching for a young queen, placed the frame on which she was too near the next frame and not in the position I found it. The queen at the time had her head in a cell. The comb at that point projected a good deal. Two days after this I searched again for the queen, to show her to a friend. I found her in the position in which I last saw her, nearly starved and past recovery.

Colonies infested with worms are often seen carrying out imperfect and mutilated bees.

Queen cells are frequently cut down by want of care in replacing combs at the proper distance after examination. E. P.

 Royal cells containing queens nearly ready to emerge, must be handled with great care when removed from the comb to which they are attached, and inserted in another. The embryo is then still soft and delicate, will be injured or crippled if the cell be shaken or accidentally let fall, and defective wings or other malformation may be the result. When inserting a royal cell, we must be careful also to place it so that the bees cannot readily have access to its base, from the rear or the opposite side of the comb, or they will be apt to open it there and destroy the embryo. In such case, a circular opening is made, and the apex and sides of the cell remain closed; and on a cursory examination, the observer would suppose that the queen had not yet emerged, though long since destroyed.

Farmer's Club Talk.

Bees and Bee Hives.—H. STEELE, of Jersey City, exhibited a box of honey, to show the plan of working movable frames. An ordinary box, with glass sides, such as are used four to a set, on top of a hive, has three light wooden frames that fit in the box, the upper slats of which close the top of the box, and in each of these the bees make a sheet of comb, about six inches across each way, which can be taken out separately, and proves much more convenient than where the comb is attached to the sides of the box.

[What is valuable in this arrangement is not new. Top boxes for surplus honey, fitted up with suitable frames to receive the combs, have been in use ever since the movable comb principle has been adopted in practical bee culture. Instead of having the upper slats of the frames constitute the top of the box, it will be found more convenient, on trial, to have the frames arranged in the customary manner, with a separate top or cover for the box.]

Bee Moth Protectors.—Mr. STEELE also showed his plan of keeping moths out of bee hives, which we have heretofore described, but the plan has proved such a good one, that it is worth calling attention to it again. It is a frame, about one inch and a half deep and twelve inches long, with six or eight half-inch holes through it, in each of which hangs a tin door, one half opening out and the other opening in, which hang so lightly that they do not interfere with the passage of the bees, for they directly learn how to push through, but the moths cannot pass. In addition to this, to give ventilation, he has a frame several inches wide under the edge of the hive around the other three sides, with large openings covered with wire-gauze. Some recommend instead, to have a hole through the bench under the hive, say six inches square, covered with wire-gauze, and then fix the little frame that holds the trap-door entrances in the side of the hive, so that it can be taken out, if necessary, to give free passage for the bees, when moths are not dangerous. The cost of these moth-traps is only 13 cents each, and one might save a hive worth \$13.

[There has been much "ingenious thought" wasted on fanciful contrivances; and this is one of the number. It may indeed prove to be literally a bee moth protector, but certainly will not secure a colony from the ravages of the worms. A beekeeper who has zeal and taste enough to think of adopting any kind of improvements, will hardly stop short of introducing the movable comb hive in his apiary and learning to use it as it ought to be. When he has accomplished that, he will want neither bee moth protectors nor special arrangements for ventilation, as he can easily get the worms out and let the air in, when he has occasion to do either.]

Dr. TRIMBLE, the special entomologist of the Club, said he had seen the moth-trap in operation, and highly commended it. He also gave the

Club the benefit of a somewhat oft-repeated dissertation upon the subject of the value of bees in fertilizing flowers, declaring that many of them would remain barren but for bees and other insects; and that the reason why the first clover blossoms were barren, was because there were at that time no humble bees to fertilize them, as they alone have tongues long enough for that purpose.

The CHAIRMAN intimated that the gentleman knew not whereof he spoke.

ANDREW J. FULLER—I want to know if this Club will sanction the remarkable doctrine about bees fertilizing flowers. If it does, I dissent. I don't believe in the necessity of bees to fertilize clover or anything else. I know, as all other gardeners do, that Nature has other sure ways to effect this object without having recourse to bees.

Mr. BERGEN, an old gardener—Certainly bees do not fertilize wheat by carrying the pollen from one head to another, because they do not work upon it. I don't believe it is necessary for the bees to carry pollen from one plant to another to fertilize anything. It is true that their acts do hybridize flowers, and sometimes very much to the injury of gardeners, but that plants would not be fruitful, if it was not for bees, I can't believe.

[No one, we believe, has ever contended that bees are absolutely indispensable for the fertilization of all kinds of blossoms; but that their aid is at least highly essential in the cultivation of some kinds of fruit, is no longer to be questioned. The fact has been repeatedly demonstrated since the modern "Orchard Houses" have come in vogue.]

Mice in Bee Hives.—WM. S. CARPENTER stated that he had lost more bees from the mice getting inside, than from moth. What will prevent their depredations? Certainly not this moth-trap. They get in the hive, whether to eat the honey, I cannot say, and make nests there, which finally destroys the swarm.

Dr. TRIMBLE said that the common house mice never troubled bee hives. It is a sort very rare in this country. It is somewhat Kangaroo-shaped, with a long slim tail.

[Mice will rarely attempt to enter a properly constructed hive well filled with bees. In the fall, when the population diminishes and guards no longer protect the entrance, this should be so contracted as to permit the passage of only a few bees at a time. When this is done, and there are no holes or crannies in other parts of the hive, mice will not have an opportunity to enter and commit depredations. The common field mouse is the only one which shows much disposition to be troublesome in this way.]

Stingless Bees.—*Bees in Honduras.*—A discussion upon this variety of bees ensued, brought about by the circumstance of Mr. Gore, of New Jersey, who is about to emigrate to that country, in company with about 70 persons, to form a colony. Mr. Gore said he had been told that the bees of that region do not store up honey.

SOLOX ROBINSON—That is undoubtedly an error; else why do the inhabitants keep such quantities of them around their dwellings. It is true, they

do not store it in wax combs, like our bees, but in sacks, some of which are as big as hen's eggs, and these are attached all around the sides of the hives.

[The Mexican and South American stingless bees might probably be made a source of profit in their native latitudes, if their instincts and habits were thoroughly studied and well understood. They are not suited to northern climates, and cannot be preserved here, as mere curiosities, without great care and difficulty.]

Bee Culture in Common Hives.

No. IV.

BY F. W. GUNDELACH.

A well stored populous colony from which a natural swarm has issued in the spring, usually sends forth a second swarm on the tenth day thereafter; and this swarm is accompanied by a young and unfertile queen.

A colony from which a forced or artificial swarm has been driven, will not yield a second swarm naturally *before* the thirteenth day, unless the bees had already built royal cells when the artificial colony was drummed out; but usually the second swarm issues on the fourteenth day.

Second swarms, as I have before remarked, are never so contented and tranquil as first swarms, because the bees have much less attachment to a young and unfecundated queen, than to an older and fertile one. They are also much more disposed to abscond, because the young queen, whose abdomen is yet unburdened with eggs, flies rapidly and with ease, and finds no difficulty in following or accompanying the bees whithersoever they choose to wend their way. This makes it necessary for the apiarian to be "on hand" when second swarms may be expected, and be in readiness to secure and hive them when they issue.

To prevent the absconding of these swarms, I employ a tin syringe, two feet long and $1\frac{1}{2}$ inches in diameter, having an iron or steel piston-rod, and a nozzle perforated with numerous very fine holes. By means of this instrument, I can project a stream of water twenty or thirty feet high, causing it to spread and descend like a gentle shower of rain; and when this is so directed as to fall among the swarming bees, they speedily alight and cluster. As soon as they have settled, I proceed to hive them in the good old-fashioned manner, if they are suspended where they are easily accessible. When all or nearly all the bees have entered the hive, I immediately carry it to its destined permanent stand—taking care, how-

ever, to place it as remote as possible from the parent hive, and also at some distance from any other hive, that the young queen, when returning from her excursion, may more certainly find her own proper home.

For the purpose of more easily securing and hiving swarms which happen to cluster on limbs or branches of tall trees, where they are difficult to be got at, even with the aid of a ladder, I have constructed a hiving apparatus which is both simple and cheap, and answers its design exceedingly well. I formed a ring or hoop, twelve inches in diameter, of half-inch iron wire, and across its diameter I placed a straight piece of the same wire, fourteen inches long, so fastened as to leave one inch of each end project over the periphery of the hoop, to serve as pivots or axes on which it is to swing when suspended. I then attached to this hoop the mouth of a muslin sac, $12\frac{1}{2}$ inches in diameter and 18 inches long, turning the margin of the muslin over the hoop and sewing this in securely. I next prepared a piece of oak wood, 18 inches long and 2 inches square, by boring a $\frac{3}{4}$ inch hole through it $2\frac{1}{2}$ inches from each end, and a $1\frac{1}{2}$ inch hole midway between these. In the outer holes, I inserted two uprights of oak, two feet long and one inch square, reducing two inches of one end of each upright, sufficiently to fit them tight in the $\frac{3}{4}$ inch holes of the first piece. Thus fitted in, they form the two prongs of my hiving fork. Two inches from the projecting end of these prongs, and on the inner side of each, facing each other, I bored a half-inch hole through, to receive the pivots or axes of the hoop, reducing these slightly by filing, so as to let the hoop and its appended sac play freely when suspended. Now, inserting one end of a pole in the $1\frac{1}{2}$ inch hole bored in the first mentioned piece, I can elevate the hiving sac, and it will always swing vertically, mouth upward, whether the pole be held perpendicularly or obliquely; and by adapting the length of the pole to the height at which the swarm has clustered, I can place the mouth of the sac immediately under it, to receive the bees when shaken down. I have also two other light and strong poles, one of which has an iron hook fastened to one end of it, and is used to draw down and shake or jar the limb or branch on which the swarm has settled, after the hiving sac has been elevated; and the other is in like manner armed with a hand-brush, by which the swarm can be swept off into the sac, when clustered on a limb too stout to be shaken by means of the hook. With this apparatus, I can readily secure swarms, though lodged in dangerous positions or where they cannot otherwise be conveniently reached.

When a swarm clusters in a low bush, hedge, or other place where it is not easily accessible, I use an empty basket hive, a bottom-board, a wing, and a bellows for securing it. If, for instance, it is lodged in a currant or gooseberry bush, I push the bottom-board under the bush, along the ground, till it touches the stem or stems—placing it, as much as practicable, directly below the swarm, and bedding its edges in the ground so as to prevent bees from getting under it. I then place a piece of old linen loosely rolled up, like a segar, in a brass tube fitted to the nozzle of my bellows (which is double-acting, and throws a regular and uniform stream), and kindling it, I am ready to commence the operation. Brushing down a handful of the bees on the bottom-board, I instantly invert the empty hive over them, with the entrance in the direction of the cluster. These detached bees immediately begin to hum at the entrance. In the absence of the queen, however, they would not long continue to do so, but return to join the swarm. Anticipating this, I resort to my bellows, and commence blowing smoke on the swarm from above, and generally succeed, in two or three minutes, in driving down the entire mass on the ground or the bottom-board. The joyful humming of the bees at the entrance of the hive, soon attracts the descending crowd, which at once rushes forward in a broad stream, thronging the narrow passage, to take possession of the new-found dwelling. When this stream begins to rush in the desired direction, I cease to drive them with smoke, but elevate the hive slightly, by gently shoving a few thin wooden wedges under its edges, to facilitate the admission of the eager and fast-coming multitude. If they were annoyed by smoke at this period, they would be apt to take wing, and if they did not abscond altogether, might cluster in a worse place, or at least render a repetition of the operation necessary.

Ordinarily, I put my second swarms in empty hives. There is not so great an advantage in giving these furnished hives, as in the case of first swarms, for they generally come at a period when pasturage is plentiful. And, moreover, as a week or ten days will usually elapse before the young queen begins to lay, cells enough will be built for her accommodation before they are really needed for the reception of eggs. The case is otherwise with the fertile queen of a first swarm; for she is ready to begin laying eggs as soon as the bustle of hiving is ended.

It is not the season alone, nor the length of time, nor the number of months, but the plenty, penury, or want of materials to employ them and work upon, that determines the labors of bees.—
THORLEY.

[From Dzierzon's "RATIONAL BEE CULTURE."]

Foulbrood.

Unquestionably the most grievous and devastating evil that can befall the beekeeper, is the introduction and spread of foulbrood in his apiary.

This disease, as its name denotes, does not attack the mature bees, but the young brood exclusively, which generally dies and putrefies after the cells have been sealed; though the larvæ also are not exempt from its ravages. The worst feature of this malady lies in this, that not only is the brood destroyed, but the cells likewise are so contaminated that not only does the disease become continually more and diffused through the hive, from cell to cell, but, owing to its contagious character, it spreads from hive to hive, and from one apiary to another, if effectual remedies are not at once employed to eradicate it. Nor can the hives in which it has existed be safely used again, for a considerable time after they have been emptied.

When, among healthy brood, a few cells are found here and there, containing a smeary viscid matter, or a greyish-brown or black crust-like substance—the dried remains of larvæ or nymphs—it may be regarded as the unmistakable evidence of the existence of foulbrood. If the larger number of the cells are in this condition, this disease must have prevailed in the hive for some time, and have attained an aggravated stage. In common hives, where the combs are not movable, the evil announces itself by the disagreeable fœtid odor issuing from the entrance, and which resembles that of putrifying glue or animal matter. The bees endeavor, at times, to remove some of the dead larvæ before putrefaction commences, and thus we may occasionally find such on the bottom board of the diseased colony. They also attempt to detach and cast out of the cells the dried black crust-like substance. This may then be found among the droppings, and if rubbed between the fingers, emits the above-described fœtid odor.

Colonies thus afflicted do not build new comb in the spring, when other colonies are busily engaged in such labor, or do so only if they are still populous and pasturage is unusually abundant. If the combs be pressed asunder, we shall see that the brood is not placed regularly and uniformly: occupying rather isolated spots; and on cutting out a piece of such comb, we shall generally find, in the putrid matter contained in the cells, ocular proof of the existence of the disease.

There are two kinds of foulbrood. The one is curable and rather innocuous; the other is pestilential and incurable. Nevertheless, both are contagious.

The curable kind presents itself in this form: The unsealed larvæ die while yet lying *coiled on the bottom of the cell*, become putrid, and dry up on the bottom into a crust-like substance easily removable. Such of the brood in the cells intermixed with those diseased, which does not perish before capping, for the most part remains healthy and matures in due time; though we occasionally meet with exceptional instances of putrid nymphs in such capped cells.

In pestilential foulbrood, precisely the converse of this occurs. Here the brood does not perish till after it has been capped and begun to undergo its metamorphosis. The putrid mass is then not found on the bottom of the cell, but on the horizontal portion of the cell walls. It is brownish and viscid; and, in consequence of the heat of the hive and the admission of air through a small orifice in the sunken cap, it dries up as a hard black crust which the bees cannot detach, and which they can only remove by totally destroying the cell.

The spread of this dangerous disease is commonly the result of feeding honey obtained from infected colonies, or which the bees themselves procure from hives in which such colonies are lingering out their feeble existence. If this happens at a time when the healthy colony contains unsealed brood, the disease will pretty certainly be generated, though it may not make its appearance immediately. In an emergency, honey taken from colonies so diseased may be used for feeding in the fall, when the hive to be fed *no longer contains brood*; but it should never be given to them in the comb, for if this should inadvertently be left remaining therein, foulbrood may easily be the result of such feeding, soon after brooding is recommenced. Though it is certain that while one section of a double or twin hive was suffering exceedingly from the ravages of the disease, the other section remained wholly unaffected; it is equally certain that to stocks standing in close proximity to one which is so suffering, the infection may very speedily be communicated. Nay, the beekeeper himself may convey it from hive to hive, if after performing some operation on a diseased stock, he proceeds to work at a healthy one, without first carefully washing his hands and the knife or other instrument which he has been using. One who has a large apiary, will find it highly advantageous to remove from his premises at once, every colony in which he discovers symptoms of foulbrood, placing them, if possible at least two miles from any other stocks or apiary. The least troublesome and most efficient mode of arresting the disease, is immediately to sacrifice the colony

in which it makes its appearance, stifling and then burying the bees, and burning up the hive with its contents.

The remedial treatment of diseased stocks, varies according to the season of the year when the disease makes its appearance or is first discovered, and its more or less virulent type. The curable kind, which not unfrequently occurs spontaneously, or rather, is generated when the bees are gathering stores from certain species of plants or trees, such as the German heathberry (*Vaccinium myrtillum*), and the various kinds of spruce, hemlock, &c.* This type of foulbrood not unfrequently disappears again, under favorable circumstances, when a change of pasturage ensues. But the beekeeper cannot calculate on such result. The disease may at almost any moment assume a more virulent form, spread rapidly, and prove exceedingly devastating. To arrest it, the queen should immediately be removed, when a single cell containing such diseased brood is discovered in a comb; and she may be used with advantage in the spring or early part of summer, for supplying an artificial colony, or be given to a hive from which a forced swarm is driven. If the bees for the artificial colony are taken from a healthy stock, no fear need be entertained that the removed queen will communicate the disease. But if the transfer of some of the workers of the infected stock also, be unavoidable, the artificial colony must first be put in an empty hive, and so kept for forty-eight hours; giving them some pure honey or dissolved candy after they have been confined seven or eight hours—feeding very sparingly even then. When finally placed on their destined hive, the queen must still be kept confined several days, to prevent the production of brood till the bees have fully digested all the infected honey brought from the diseased stock, and can prepare pure food for the larvæ.

As no eggs are laid in the old hive after the removal of the queen, there will in a few days be no larvæ remaining to be affected by the disease; and before the young queen is reared and begins to lay, the workers will have had ample time to cleanse the cells thoroughly. They will do this the more effectually if the combs be so shortened, by pruning, that they will be completely covered by the bees. The new brood will usually be found healthy, and the stock will speedily recover. This result however would be more certainly attained, if all the old combs were removed as soon as the

* We have for some years suspected that some species of evergreens are the chief source from which foulbrood originates. But from its contagious character, the disease may obviously become diffused in various ways.—Ed. B. J.

brood has emerged, and the bees transferred to a clean hive. But this can be done conveniently only where movable comb hives are used, and is an additional proof of the superiority of such hives. It is not safe to transfer the stock bodily into an empty hive, and require them to build new combs, unless the bees are numerous and the pasturage is still sufficiently abundant to enable them to gather the necessary supplies.

As an additional precaution against a recurrence of the disease, the young queen may also be removed after she has become fertile and has supplied a few combs with eggs—using her for building up an artificial colony or supplying one that has become queenless. In fact, the most profitable use that can be made of stocks infected with foulbrood, is to devote them to the rearing of young queens. But as, after the removal of the first queen, they will be unable to rear one from the brood in the hive, if the larvæ selected happen to be infected, they should in the first instance be supplied, if possible, with a sealed royal cell from some other colony; or when this cannot be done, a piece of comb containing healthy larvæ should be inserted. Subsequently, there is less likelihood that the selected larvæ has been infected, and they may be allowed to rear queens from their own brood. Thus employed, diseased colonies may in reality be made as profitable as those which are healthy, producing a number of queens in the course of the summer, and yielding some surplus honey besides. Such operations may be safely made, since it is a well ascertained fact that the queens do not communicate the infection to the colonies in which they are introduced; and the beekeeper in whose apiary foulbrood makes its appearance, will find it advantageous to have always on hand a supply of supernumerary queens. His constant endeavor must be to raise young stocks, so as to be able to break up in the fall every colony respecting the healthiness of which the least doubt may be entertained. It would be folly on his part to undertake to winter stocks suspected of being infected, while hundreds are annually *brimstoned* for the sake of their honey and wax. It is besides utterly inexcusable to retain an incurably diseased colony in autumn, because it happens to have formerly been an excellent one. Even in the spring such a colony should at once be destroyed when the nature of the malady is ascertained; taking pains to do it without permitting bees from healthy stocks to appropriate any portion of the honey, and thus spread the disease. The interior of the emptied hive, if it is worth preserving for future use, should be well singed with a wisp of burning straw and closed up to prevent bees from

entering it; though the singeing alone is not sufficient to disinfect it. Time alone can do that effectually; and it should be well aired for at least two years before a colony is introduced, if we would be entirely secure against a recurrence of disease from the remains of the original infectious matter. It is by no means certain that sulphuring the hive, or washing it with a solution of chloride of lime, will thoroughly purify it, and these means should therefore not be confidently relied on. Even boiling an infected hive in a brewer's kettle proved insufficient, for after it was dried and restocked, the disease soon made its appearance again in the colony. No dependance can consequently be placed in such and similar processes. They may answer the end designed, in treating the mild kind of foulbrood; but when the disease is of the virulent and pestilential type, they will utterly fail. Here the only question is, what can be done to limit the injury to a minimum? The queen should be forthwith removed, as she can still be made to render valuable service, if young and fertile. But though the bees succeed in removing every perceptible trace of disease and impurity, before the young queen matures, it is idle to indulge the hope that the health of the colony has been thereby re-established. The malady will almost certainly reappear in its pristine malignant form, as the pestilential virus will probably have meantime been communicated to all the stores, and rendered impracticable the preparation of uninfected food for the larvæ. The new queen should, therefore, likewise be removed as soon as she has become fertile, and a sealed royal cell given to the colony some days after; or the bees should be driven out and treated as before directed, and the honey used for any suitable purpose except that of feeding therewith colonies which happen to be in need. Even expulsion and confinement do not always enable us to save the colony. We cannot safely give them combs with brood, lest the disease be at once communicated thereto; and the bees and queen are hence apt to abscond when again allowed to fly.—Taking into view all the difficulties and risks, I would advise the prompt and total destruction of the colony as soon as it is ascertained that the malady from which it is suffering, is *malignant* foulbrood.

As prevention is easier than cure, those who have occasion to feed their stocks, particularly in the spring, should be exceedingly careful as to the honey they use, and be certain that it is not derived from an infected source. If there is the slightest doubt respecting its quality or purity, it should in no case be used. Sugar candy, or dissolved brown sugar, should be employed in preference, as being both safer and cheaper, and quite as acceptable and serviceable to the bees.

[For the Bee Journal.]

BEE ITEMS FROM MAINE.

I see it frequently stated that 1860 was the poorest honey, or rather bee year for a long time past, throughout the whole world; but of this I can only judge from reports. Here in Maine, taking my starting point at 44° 46' N., as far as I have been able to learn, it was full an average of years in the production of swarms and honey; but, trouble in the winter of 1860-61, began to show itself.

Some think the trouble arose from a fall harvest which the bees gathered from the alders—*Alnus serrulata*—which abound here, proving poisonous to them in the winter. An abundance of evergreens are accessible in almost every place; and after the summer drouth broke, the bees were very active till late in the fall, in their visits to these several kinds of trees, and especially so to the alders, after there had been frosts sufficiently severe to kill vegetation generally.

This spring, 1861, was an uncommonly wet, cold and backward one. Bees died to a fearful extent, both in the winter and till even May, and many stocks did but just enough survive to be able to mature brood after continued warm weather. The report generally was "honey enough" in the hives of those which perished.

The box hive is mostly in use, though there are many patent hives used, and many thrown aside as useless. Many traditional whims also are in vogue, like informing the bees of all the deaths, &c., &c., and dressing them in mourning.

The first swarm that I could learn of came out July 4th; but only a few, who had from one to five stocks, which lived, have had a single swarm, and those generally about the middle of July, or to be more exact, from the 10th to the 20th. Swarms were looked for as late as August 20th, but I do not know of any issuing so late. There are not half the number, probably, of stocks this fall that there were last.

The honey harvest, this season, is correspondingly small; so that, but a part of the July swarms will have enough to winter upon.

Elm Tree Farm, Maine.

O. W. TRUE.

OCTOBER.

"But farmer, look, where full-eared sheaves of rye
Grow heavy on the till; that soil select
For apples; thence thy industry shall gain
Ten-fold reward; thy garner, thence with store
Surcharged, shall burst: thy press with purest juice
Shall flow, which, in revolving years, may try
Thy feeble feet, and bind thy flattering tongue."

Please send us the names of beekeepers.**AMERICAN BEE JOURNAL.****Philadelphia, October, 1861.****AGENTS FOR THE BEE JOURNAL.**

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Monthly Management.

OCTOBER.

If, from want of leisure or other cause, the union of stocks too weak to be wintered separately has been hitherto delayed, it can still be done on any fine mild day in this month. There will now be very little brood remaining in such colonies; and if placed in a cool and airy chamber, the surplus empty combs are not so liable to be injured by the moth and worms, as at an earlier period—though they should still be occasionally examined. If they be suspended in a close box, and exposed for an hour or two to the fume of burning brimstone, they will keep safely till the approach of spring: and renewed fumigation then will preserve them uninjured, till required for use when the bees are gathering honey or artificial colonies are to be made.

The more quiet the bees can now and henceforward during the winter be kept, the better; and they should, therefore, not be disturbed by feeding them, unless in the event of absolute necessity. When any colony is likely to be in need, honey should, if possible, be given them in sealed combs; and where liquid honey or dissolved sugar candy has to be fed, it should be placed within the hive in the evening, and the vessel removed early next morning. Give, on each occasion, as large a dose as the bees can carry up during the night, and repeat this till they have received an adequate supply. The earlier in the fall they are thus provisioned, the more properly will it be stored up in the combs, and the more likely is it that the bees will seal it up in the cells. If it can be conveniently placed, a portion, at least, of their supplies should be in the form of sticks or lumps of candy, because fluid food, given late, may remain unsealed in the cells, and is then apt to turn sour before spring and induce dysentery. Besides, where there is a large quantity of unsealed food, the temperature of the hive will be colder than is consistent with the comfort and health of the bees, and the confined air will become charged with an excess of moisture. If the bees are in a common hive, and have insufficient stores, the better way to supply them, is to cut a hole four inches square in the top of the hive, remove a portion of the comb, introduce a piece of thin coarse linen and place the sugar candy therein. Then invert a small tight box over the hole, covering and surrounding it with tow, or cotton waste, to prevent the escape of heat from the hive. An old-fashioned hive, containing a weak stock, may also be provisioned by inverting it, shortening the combs

considerably, laying thin slats or bars across them and placing sticks of candy thereon. Tie a cloth over the mouth of the hive to keep the bees confined, and set it in its inverted condition in a warm place, till the candy has been carried down. This plan may be resorted to in the winter, to save a colony from starvation; but cannot be recommended for general purposes. If a comb containing sealed honey can be procured, and be laid on the shortened combs of the inverted hive, instead of the slats and candy, the bees will generally attach it securely in the course of the ensuing night; and the hive may then be turned up again and replaced on its stand.

It is, however, in all cases best not to winter colonies which are deficient in stores. Nothing short of absolute necessity can excuse it. Better break them up, uniting the bees with some other stock, and preserving the combs for future use. If given to an early swarm next season, more advantage will be derived from such comb, than from half a dozen poor starveling stocks which have required anxious attention for months, and may finally desert their hives in the spring.

Wasps are apt to become troublesome at this time, when the bees have retired to their winter quarters and left the entrance of the hives unguarded. If their visits are frequent, they carry off much honey and kill many bees. They should be killed wherever found, and numbers may be caught in vials half-filled with sugar water and suspended near the apiary. Mice should be excluded from the hives, by reducing the entrance so that only a few bees can leave or enter at a time.

Second swarms and weak first swarms cannot be induced to build drone combs; and where pieces of such are used as guide-comb, the bees, after constructing a few rows of intermediate cells, will build worker comb exclusively. But the case is otherwise if we give them drone-comb foundations to work upon, or drone comb from which the superstructure of cell-walls has been removed. On these, drone cells will be rebuilt. This shows that though bees, not intending to make preparations for swarming the same season when they are hived, will not construct the foundations of drone comb, they will nevertheless use them and build drone cells, if such foundations are furnished ready made.—DÖNNORF.

As a supply for the winter, a strong stock should, on the first of November, contain at least one pound of honey for every thousand bees; and a weak stock should then have a pound and a half for every thousand bees.—HOFMAN.